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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,350	10/17/2003	Gerald A. Ziegler	WEYE121722/25320	2305

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EXAMINER	
MILLER, ROSE MARY	
ART UNIT	**PAPER NUMBER**
2856	

DATE MAILED: 06/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/688,350	ZIEGLER ET AL.	
	Examiner	Art Unit	
	Rose M. Miller	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 October 2003 and 22 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-8, 11, 13-19, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Andrews et al. (WO 01/77669 A1)** in view of **Aune et al. (US 5,023,805)**.

With regards to claims 1-4 and 6, **Andrews et al.** discloses a method of calculating a value (stiffness) of a mechanical property of an object (timber), the method comprising: measuring the density of the object (timber) utilizing radiation (see page 17 line 7 – page 18 line 5), measuring the velocity of sound wave propagating through the object (see page 6 lines 1-29), and calculating the value (stiffness) of an object mechanical property using the density and sound wave (acoustic) velocity measurements (see page 12 lines 14-29), wherein the calculated value is bending stiffness (MOE, see abstract, page 12 lines 14-29), the object is a wood containing

product from the recited list (timber or cut tree, logs), and the sound wave is a stress wave induced into the object (impact generated by striking the sample, see page 6 line 2).

Andrews et al. discloses the claimed invention with the exception of the density being specifically measured by detecting radiation absorption in the test object.

Aune et al. '805 teaches that it is known in the art of log or timber processing to utilize an x-ray scanner, in particular the absorption of the x-rays, to determine the density of a test log in order to maximize the utility of the log by optimizing the cutting of the log.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a radiation absorption system for the density testing subsystem of **Andrews et al.** as **Aune et al. '805** teaches that radiation absorption is known for providing a good indication of the density of a log such that the log can be cut such that the lumber or material obtained from the log can be optimized.

With regards to claim 5, **Andrews et al.** discloses the claimed invention with the exception of specifically utilizing an ultrasound wave as the sound wave induced into the object. **Andrews et al.** discloses at page 6 line 1 that the wood stem or log receives an "acoustic impulse". It is well known in the art of acoustic measuring and testing that ultrasound waves are merely acoustic waves having frequencies above 20 kHz, which is the top acoustic frequency receivable by the human ear. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that ultrasound waves would be induced in the log of **Andrews et al.** if the resonant frequency of the log was sufficiently high enough to generate such acoustic frequencies within the testing object.

Furthermore, it is known throughout the art of acoustic measuring and testing that acoustic waves of differing acoustic frequencies are attenuated at different rates dependent upon the properties of the test object through which the waves are propagated. Therefore, one of ordinary skill in the art would have known to select the proper frequency to propagate the desired distance within the test object in order to provide the desired test results.

With regards to claims 7-8, **Andrews et al.** discloses the claimed invention with the exception of the density being specifically measured by emitting radiation into the object from a radiation source, detecting the amount of emitted radiation that travels through the object, generating signals indicative of the detected radiation, processing the generated signals, and calculating the density of the object based on the generated signals.

Aune et al. '805 teaches that it is known in the art of log or timber processing to utilize an x-ray scanner, in particular the absorption of the x-rays, to determine the density of a test log in order to maximize the utility of the log by optimizing the cutting of the log where the density is measured by emitting radiation into the object from a radiation source and detecting the amount of emitted radiation that travels through the object, generating signals indicative of the detected radiation, processing the generated signals, and calculating the density of the object based on the generated signals.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a radiation absorption system as taught by **Aune et al. '805** for the density testing subsystem of **Andrews et al.** as **Aune et al. '805** teaches that radiation absorption is known for providing a good indication of the density of a log such that the log can be cut such that the lumber or material obtained from the log can be optimized.

With regards to claims 11 and 13, **Andrews et al.** discloses at page 15 line 30 – page 16 line 14 producing a moving stress wave (compression wave) within the object by impacting the object along its longitudinal axis (timber struck at one end), causing the object to freely vibrate at a harmonic resonance frequency; sensing the stress wave (compression wave) as the stress wave propagates through the object (transducer mounted at or near end of timber) with a transducer, and generating signals associated with the stress wave (compression wave); processing the signals generated by the transducer, the resonant frequency of the object obtained by processing the transducer signals (see page 16 lines 5-7); and determining the stress wave velocity of the object (page 16 lines 7-14) including obtaining the longitudinal dimension of the object (page 16 lines 7-8); obtaining the resonant frequency value of the induced stress wave (page

16 lines 6-7); and calculating the stress wave velocity through the object based on the longitudinal dimension value and the resonant frequency value (page 16 lines 7-14).

With regards to claims 14 and 15, **Andrews et al.** discloses the claimed invention with the exception of specifically radiating radiation in the direction of the wood produce transverse to the longitudinal axis thereof and detecting radiation that passes through the wood product.

Aune et al. '805 teaches radiating radiation in the direction of the wood produce transverse to the longitudinal axis thereof and detecting radiation that passes through the wood product in order to determine the density of the wood product under test.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a radiation absorption system as taught by **Aune et al. '805** for the density testing subsystem of **Andrews et al.** as **Aune et al. '805** teaches that radiation absorption is known for providing a good indication of the density of a log such that the log can be cut in order to optimize the lumber or material obtained.

With regards to claim 16, **Andrews et al.** fails to disclose the use of an ultrasound transducer to induce the sound wave within the test object. **Andrews et al.** discloses at page 6 lines 15-16 that any "suitable system for measuring acoustic velocity may be used". **Andrews et al.** also discloses at page 16 line 2 utilizing a transducer to detect the compression wave (stress wave) within the test object. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the acoustic transducer (or ultrasonic transducer) to both induce and receive the acoustic wave generated by the testing system as the advantages of utilizing a transducer for generating acoustic/ultrasound waves within a test object are well known in the art of acoustic measuring and testing. Some of the advantages, but not all, include better control of the amount of force applied to the testing object, better control of the frequency of the signal generated, and better control of the length of the signal applied to the test object. Therefore, one of ordinary skill in the art would utilize an ultrasound transducer when appropriate for generating an acoustic or ultrasound signal in a test object.

With regards to claim 17, **Andrews et al.** discloses the claimed invention with the exception of specifically disclosing the density measurement subsystem (108) including a radiation source positioned transverse to the longitudinal axis of the wood product and a radiation detector positioned on the side of the wood product opposite the radiation source.

Aune et al. '805 discloses a density measurement system including a radiation source positioned transverse to the longitudinal axis of the wood product and a radiation detector positioned on the side of the wood product opposite the radiation source.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a radiation absorption system as disclosed by **Aune et al. '805** for the density testing subsystem of **Andrews et al.** as **Aune et al. '805** teaches that radiation absorption is known for providing a good indication of the density of a log such that the log can be cut such that the lumber or material obtained from the log can be optimized.

With regards to claim 18, **Andrews et al.** discloses a processor within the velocity measurement subsystem for receiving signals from the receiving sensor (transducer) and analyzing the received signals to determine the acoustic velocity within the test object. It is inherent the processing unit disclosed be able to execute a stored routine that calculates the velocity of the induced sound wave based on the signals received from the receiving transducer as **Andrews et al.** clearly indicates that the acoustic velocity is calculated from the measured signals and processors are known to operate by executing stored routines which tell the processor how and what work must be performed. Therefore, **Andrews et al.** discloses the claimed invention with the exception of specifically showing a processing unit within the density measurement subsystem to communicate with the radiation source and radiation detector and executing a stored routine that calculates the density of the wood product. **Andrews et al.** clearly indicates that a density measurement is performed within the testing system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a processing unit to determine the density as it is known that processing units can be programmed (usually through stored routines) to perform what

ever functions are desired in order to provide the testing system with the desired calculations and necessary outputs to perform the desired test and are utilized for such throughout measuring and testing.

With regards to claim 21, **Andrews et al.** discloses at page 21 lines 22-25 utilizing a calculating unit (computer 106) to receive the calculated velocity value and the calculated density value to calculate a resultant value that is indicative of the bending stiffness of the wood product.

With regards to claims 22 and 23, **Andrews et al.** discloses an impactor for striking the end of the wood product at page 15 lines 30-31 and a transducer in contact with the wood product to receive the compression waves at page 16 line 5 (transducer mounted on end of object). As for specifically utilizing an ultrasonic transducer as the transducer, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize such as ultrasonic transducers are well known throughout the art for measuring acoustic signals of any frequency, as long as the frequency of the wave to be measured is within the frequency range of the transducer utilized.

4. Claims 9-10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Andrews et al.** in view of **Aune et al. '805** as applied to claims 1 and 17 above, and further in view of **Wang et al. (WO 02/060662 A2)** and **Pellerin et al. (US 5,024,091)**.

With regards to claims 9 and 20, **Andrews et al.** discloses the claimed invention with the exception of determining the time of flight of the induced sound wave along a known distance and calculating the velocity of the induced sound wave by dividing the determined time of flight by the known distance value.

Both **Wang et al.** and **Pellerin et al.** teach determining the acoustic velocity within a wooden object by determining the time of flight of a sound wave along a known distance and calculating the velocity of sound by dividing the determined time of flight by the known distance value (see page 12 line 25 – page 13 line 7 in **Wang et al.** and column 9 lines 4-12 in **Pellerin et al.**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a time of travel measurement for determining the sound velocity in the system of **Andrews et al.** instead of the resonant frequency measurement disclosed as **Andrews et al.** discloses at page 6 lines 15-16 that any suitable system for measuring acoustic velocity may be used and **Wang et al.** and **Pellerin et al.** teach that a measurement of time of travel of the sound wave is a known alternative for calculating the sound velocity within the wooden test object.

With regards to claim 10, **Andrews et al.** discloses the claimed invention with the exception of producing an ultrasound wave in the object by a transmitting transducer, generating signals with a receiving transducer positioned a known distance from the transmitting transducer, and processing the signals generated by the receiving transducer in the time domain, the processed signals resulting in a time value indicative of the time of flight of the ultrasonic sound wave between the transmitting and receiving transducers.

First, with respect to the use of an ultrasound wave in the object, **Andrews et al.** discloses at page 6 line 1 that the wood stem or log receives an "acoustic impulse". It is well known in the art of acoustic measuring and testing that ultrasound waves are merely acoustic waves having frequencies above 20 kHz, which is the top acoustic frequency receivable by the human ear. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that ultrasound waves would be induced in the log of **Andrews et al.** if the resonant frequency of the log was sufficiently high enough to generate such acoustic frequencies within the testing object.

Furthermore, it is known throughout the art of acoustic measuring and testing that acoustic waves of differing acoustic frequencies are attenuated at different rates dependent upon the properties of the test object through which the waves are propagated. Therefore, one of ordinary skill in the art would have known to select the proper frequency to propagate the desired distance within the test object in order to provide the desired test results.

Second, with respect to the use of a transmitting transducer instead of the disclosed impactor, **Andrews et al.** discloses at page 6 lines 15-16 that any "suitable

system for measuring acoustic velocity may be used". **Andrews et al.** also discloses at page 16 line 2 utilizing a transducer to detect the compression wave (stress wave) within the test object. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the acoustic transducer (or ultrasonic transducer) to both induce and receive the acoustic wave generated by the testing system as the advantages of utilizing a transducer for generating acoustic/ultrasound waves within a test object are well known in the art of acoustic measuring and testing. Some of the advantages, but not all, include better control of the amount of force applied to the testing object, better control of the frequency of the signal generated, and better control of the length of the signal applied to the test object. Therefore, one of ordinary skill in the art would utilize an ultrasound transducer when appropriate for generating an acoustic or ultrasound signal in a test object.

As for processing the signals in the time domain to produce a time value indicative of the time of flight of the wave between the transmitting and receiving transducers, both **Wang et al.** and **Pellerin et al.** teach determining the acoustic velocity within a wooden object by determining the time of flight of a sound wave along a known distance and calculating the velocity of sound by dividing the determined time of flight by the known distance value (see page 12 line 25 – page 13 line 7 in **Wang et al.** and column 9 lines 4-12 in **Pellerin et al.**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a time of travel measurement for determining the sound velocity in the system of **Andrews et al.** instead of the resonant frequency measurement disclosed as **Andrews et al.** discloses at page 6 lines 15-16 that any suitable system for measuring acoustic velocity may be used and **Wang et al.** and **Pellerin et al.** teach that a measurement of time of travel of the sound wave is a known alternative for calculating the sound velocity within a wooden test object.

5. Claims 12 and 19 rejected under 35 U.S.C. 103(a) as being unpatentable over **Andrews et al.** in view of **Aune et al. '805** as applied to claims 1 and 18, respectively, above, and further in view of **Larsson et al. (US 6,347,542 B1)**.

Andrews et al. discloses the claimed invention with the exception of specifically disclosing the signals measured in the velocity measurement subsystem being converted into a frequency spectrum and the resonant frequency being located by analyzing the frequency spectrum.

Larsson et al. discloses utilizing a Fourier Transform (103 in Figure 11) to transform the received signals from the time domain to the frequency domain so that a processor can determine the resonant frequency of the test object.

Andrews et al. discloses utilizing a resonant frequency of the object under test to determine the acoustic velocity within the test object. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the Fourier Transform and locating processor of **Larsson et al.** to determine the resonant frequency of the wooden test object in **Andrews et al.** as applying a Fourier Transform to a signal to convert the signal to the frequency domain is well known throughout the art of measuring and testing as an excellent means for determining a resonant frequency of any test object and **Larsson et al.** teaches that such transformations are also an excellent way to determine the resonant frequency of a wooden test object.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Aune et al. (US 4,879,752) discloses a lumber optimizer that measures density utilizing radiation absorption by the test object.

Schajer (US 4,914,357) discloses a method for estimating the strength of wood utilizing a radiation density profile of the wood piece.

Poon (US 5,394,342) discloses a log scanning system with an X-ray density scanner.

Palm (DE 4435975 A1) discloses a device for the machine sorting of cut timber according to strength.

Palm et al. (US 5,564,573) discloses a process and apparatus for the machine sorting of sawn timber according to strength.

McGuire et al. (CA 2,235,093) discloses a method and apparatus for improved identification of probable defects in a workpiece.

Kullenberg et al. (US 6,151,379) discloses a method and device for measuring density of a log or timber.

Harris et al. (WO 01/09603 A1) discloses a log testing apparatus.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rose M. Miller whose telephone number is 571-272-2199. The examiner can normally be reached on Monday - Friday, 7:30 am to 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RMM
7 June 2005

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